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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
YAO, KWANG BIN	
ART UNIT	**PAPER NUMBER**
2667	25

DATE MAILED: 06/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/398,624	KELLER ET AL.	
	Examiner	Art Unit	
	Kwang B. Yao	2667	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-12,14-17,19,21-26,28-31 and 36-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-12,14-17,19,21-26,28-31 and 36-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *23,24*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1, 3-12, 14-17, 19, 21-26, 28-31, 36-48 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 19, 22, 23, 36, 39, 43, 44, 48 are rejected under 35 U.S.C. 102(b) as being anticipated by Leung et al. (US 4,905,231).

Leung et al. discloses a packet switch system comprising the following features: as depicted in Figs. 1, 9, 10, regarding claim 19, a first node (25) configured to transmit a first command packet in a first virtual channel (CHANNEL 2) of a plurality of virtual channels (CHANNEL 0, 1, 2, 3); and a second node (29) coupled to receive the first command packet, wherein the second node (29) is configured to generate a first response packet in response to the first command packet and is further configured to transmit the first response packet using a response virtual channel (CHANNEL 0) of the plurality of virtual channels (CHANNEL 0, 1, 2, 3) independent of which one of the plurality of virtual channels (CHANNEL 0, 1, 2, 3) is the first virtual channel (CHANNEL 2), and wherein the first node (25) is configured to transmit a

second command packet in a second virtual channel (CHANNEL 3) of the plurality of virtual channels (CHANNEL 0, 1, 2, 3), and wherein the second node (29) is coupled to receive the second command packet and is configured to generate a second response packet in response to the second command packet, and wherein the second node (29) is configured to transmit the second response packet in the response virtual channel (CHANNEL 0); regarding claim 22, wherein the first response packet specifies a first response data packet, and wherein the second node (29) is configured to transmit the first response data packet in the response virtual channel (CHANNEL 0); regarding claim 23, wherein the first node (25) is configured to allocate resources to process one or more response packets corresponding to the first command packet prior to transmitting the first command packet, wherein the one or more response packets includes the first response packet; regarding claim 36, a node configured to implement a plurality of virtual channels (CHANNEL 0, 1, 2, 3) for communicating with other nodes, wherein the plurality of virtual channels (CHANNEL 0, 1, 2, 3) comprise at least a response virtual channel (CHANNEL 0), a first virtual channel (CHANNEL 2), and a second virtual channel (CHANNEL 3), and wherein the node comprises circuitry that is configured to transmit response packets only in the response virtual channel (CHANNEL 0), the response packets generated by the node in response to packets in any of the plurality of virtual channels (CHANNEL 0, 1, 2, 3) that are defined to cause a response packet,, wherein at least one packet assigned to the first virtual channel (CHANNEL 2) is defined to cause a response packet and at least one packet assigned to the second virtual channel (CHANNEL 3) is defined to cause a response packet; regarding claim 39, wherein at least some of the response packets specify corresponding data packets, and wherein the node is configured to transmit the corresponding data packets in the response virtual

channel (CHANNEL 0); regarding claim 43, A computer system comprising a plurality of nodes configured to communicate using a plurality of virtual channels (CHANNEL 0, 1, 2, 3), wherein the plurality of virtual channels (CHANNEL 0, 1, 2, 3) comprise at least a response virtual channel (CHANNEL 0), a first virtual channel (CHANNEL 2), and a second virtual channel (CHANNEL 3), and wherein a first node (25) of the plurality of nodes is configured to transmit response packets only in the response virtual channel (CHANNEL 0), the response packets generated by the first node (25) in response to receiving packets from other ones of the plurality of nodes in any of the plurality of virtual channels (CHANNEL 0, 1, 2, 3), the response packets generated by the first node (25) in response to packets that are defined to cause a response packet wherein at least one packet assigned to the first virtual channel (CHANNEL 2) is defined to cause a response packet and at least one packet assigned to the second virtual channel (CHANNEL 3) is defined to cause a response packet; regarding claim 44, wherein at least some of the response packets specify corresponding data packets, and wherein the first node (25) is configured to transmit the corresponding data packets in the response virtual channel (CHANNEL 0); regarding claim 48, wherein a second node (29), prior to transmitting a first packet in one of the plurality of virtual channels (CHANNEL 0, 1, 2, 3), is configured to allocate space to store a plurality of response packets that are to be generated in response to the first packet. See Abstract; column 5, line 32 to column 10, line 15.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 5-8, 10, 11, 14-16, 24, 25, 28-30, 37, 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leung et al. (US 4,905,231) in view of Scott (US 5,748,900).

Leung et al. discloses the claimed limitations above. Leung et al. further discloses the following features: as depicted in Figs. 1, 9, 10, and described in Abstract; column 5, line 32 to column 10, line 15, regarding claim 1, receiving a first response packet in a first node (25) of the plurality of nodes, the first node (25) comprising a plurality of control packet buffers, storing the first response packet in a response buffer which is one of the plurality of control packet buffers; receiving a second response packet in the first node (25), the second response packet a response to a second control packet belonging to a different one of the at least two virtual channels from the first control packet; and storing the second response packet in the response buffer; regarding claim 5, receiving a first data packet specified by the first response packet; and storing the first data packet in a response data buffer, which is one of a plurality of data buffers included in the first node (25), the response data buffer assigned to the response virtual channel (CHANNEL 0); regarding claim 6, receiving a second response packet in the first node (25), the second response packet a response to a second control packet belonging to a different one of the at least two virtual channels from the first control packet; storing the second response packet in the response buffer; receiving a second data packet specified by the second response packet; and storing the second data packet in the response data buffer; regarding claim 7, generating the first control packet in the first node (25); regarding claim 8, allocating space to process a plurality of response packets corresponding to the first control packet prior to transmitting the first control

packet, the plurality of response packets including the first response packet; regarding claim 10, a first node (25) configured to transmit a first response packet; and a second node (29) coupled to receive the first response packet from the first node (25), wherein the second node (29) comprises: a response buffer assigned to a response virtual channel (CHANNEL 0); wherein the response packet is a response to a first control packet belonging to one of the first virtual channel (CHANNEL 2) and the second virtual channel (CHANNEL 3), and wherein the second node (29) is configured to store the first response packet in the response buffer independent of which of the first virtual channel (CHANNEL 2) and the second virtual channel (CHANNEL 3) to which the first control packet belongs, and wherein the second node (29) further comprises a response data buffer configured to store response data packets specified by response packets, and wherein the first node (25) is configured to transmit a first response data packet specified by the first response packet, and wherein the second node (29) is configured to store the first response data packet in the response data buffer; regarding claim 11, wherein the first node (25) is configured to transmit a second response packet to the second node (29) in response to a second control packet belonging to a different one of the first virtual channel (CHANNEL 2) and the second virtual channel (CHANNEL 3) from the first control packet, and wherein the second node (29) is configured to store the second response packet in the response buffer; regarding claim 14, wherein the first node (25) is configured to transmit a second response packet to the second node (29) in response to a second control packet belonging to a different one of the first virtual channel (CHANNEL 2) and the second virtual channel (CHANNEL 3) from the first control packet, and wherein the second node (29) is configured to store the second response packet in the response buffer, and wherein the first node (25) is configured to transmit a second

response data packet specified by the second response packet, and wherein the second node (29) is configured to store the second response data packet in the response data buffer; regarding claim 15, The computer system as recited in claim 10 wherein the second node (29) is configured to generate the first control packet; regarding claim 16, wherein the second node (29) is configured to allocate a buffer to store processed data from processing a plurality of response packets corresponding to the first control packet, the second node (29) configured to allocate the buffer prior to transmitting the first control packet, and wherein the plurality of response packets includes the first response packet; regarding claim 24, one or more response buffers assigned to a response virtual channel (CHANNEL 0); wherein, in response to receiving a first response packet that is a response to a first control packet belonging to one of the first virtual channel (CHANNEL 2) and the second virtual channel (CHANNEL 3), the node is configured to store the first response packet in the response buffers independent of which of the first virtual channel (CHANNEL 2) and the second virtual channel (CHANNEL 3) to which the first control packet belongs, and wherein the node further comprises one or more response data buffers configured to store response data packets specified by response packets, and wherein, in response to receiving a first response data packet specified by the first response packet, the node is configured to store the first response data packet in the response data buffers; regarding claim 25, wherein the node, in response to receiving a second response packet that is a response to a second control packet belonging to a different one of the first virtual channel (CHANNEL 2) and the second virtual channel (CHANNEL 3) from the first control packet, is configured to store the second response packet in the response buffers; regarding claim 28, wherein in response to receiving a second response packet received in response to a second control packet belonging to a different one of

the first virtual channel (CHANNEL 2) and the second virtual channel (CHANNEL 3) from the first control packet, the node is configured to store the second response packet in the response buffers, and wherein, in response to receiving a second response data packet specified by the second response packet, the node is configured to store the second response data packet in the response data buffers; regarding claim 29, the node is configured to generate the first control packet; regarding claim 30, wherein the node is configured to allocate a buffer to store processed data from processing a plurality of response packets corresponding to the first control packet, the node configured to allocate the buffer prior to transmitting the first control packet, and wherein the plurality of response packets includes the first response packet; regarding claim 37, wherein the circuitry is configured to store the response packets in one of the plurality of control packet buffers assigned to the response virtual channel (CHANNEL 0); regarding claim 38, wherein at least some of the response packets specify corresponding data packets, and wherein the node comprises a plurality of data buffers include a response data buffer, and wherein the node is configured to store the corresponding data packets in the response data buffer.

Leung et al. does not disclose the following features: regarding claim 1, each of the plurality of control packet buffers assigned to a different one of a plurality of virtual channels; the plurality of control packet buffers further including at least two additional control packet buffers corresponding to at least two additional virtual channels of the plurality of virtual channels; wherein the first response packet is a response to a first control packet belonging to one of the at least two additional virtual channels, and wherein the storing the first response packet in the response buffer is independent of which one of the at least two additional virtual channels the first control packet belongs to; regarding claim 10, a first control packet buffer

assigned to a first virtual channel different from the response virtual channel; and a second control packet buffer assigned to a second virtual channel different from the response virtual channel and the first virtual channel; regarding claim 24, one or more first control packet buffers assigned to a first virtual channel different from the response virtual channel; and one or more second control packet buffers assigned to a second virtual channel different from the response virtual channel and the first virtual channel; regarding claim 37, wherein the node comprises a plurality of control packet buffers, each of the control packet buffers assigned to one of the plurality of virtual channels.

Scott discloses a congestion control system comprising the following features: as described in column 8, lines 9-17, regarding claim 1, each of the plurality of control packet buffers assigned to a different one of a plurality of virtual channels; the plurality of control packet buffers further including at least two additional control packet buffers corresponding to at least two additional virtual channels of the plurality of virtual channels; wherein the first response packet is a response to a first control packet belonging to one of the at least two additional virtual channels, and wherein the storing the first response packet in the response buffer is independent of which one of the at least two additional virtual channels the first control packet belongs to; regarding claim 10, a first control packet buffer assigned to a first virtual channel different from the response virtual channel; and a second control packet buffer assigned to a second virtual channel different from the response virtual channel and the first virtual channel; regarding claim 24, one or more first control packet buffers assigned to a first virtual channel different from the response virtual channel; and one or more second control packet buffers assigned to a second virtual channel different from the response virtual channel and the

first virtual channel; regarding claim 37, wherein the node comprises a plurality of control packet buffers, each of the control packet buffers assigned to one of the plurality of virtual channels. It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Leung et al., by using the features, as taught by Scott, in order to provide an efficient data communication system by avoiding deadlock. See Scott, column 8, lines 16-17.

6. Claims 4, 9, 12, 17, 26, 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leung et al. (US 4,905,231) in view of Scott (US 5,748,900) as applied to claims 1, 3, 7, 8, 10, 15, 16, 24, 29, 30 above, and further in view of VanDoren et al. (US 6,279,084).

Leung et al. and Scott disclose the claimed limitations above. Leung et al. and Scott do not disclose the following features: regarding claim 4, wherein the at least two additional virtual channels further include a probe virtual channel; regarding claim 9, wherein the generating the first control packet comprises generating a probe packet in response to a second control packet received by the first node; regarding claim 12, wherein the first virtual channel is a non-posted command virtual channel and the second virtual channel is a probe virtual channel; regarding claim 17, wherein the first control packet comprises a probe packet generated in response to a second control packet received by the second node; regarding claim 26, wherein the first virtual channel is a non-posted command virtual channel and the second virtual channel is a probe virtual channel; regarding claim 31, wherein the first control packet comprises a probe packet generated in response to a second control packet received by the node.

VanDoren et al. discloses a switch-based multi-processor system comprising the following features: regarding claim 4, wherein the at least two additional virtual channels further include a probe virtual channel; regarding claim 9, wherein the generating the first control packet

comprises generating a probe packet in response to a second control packet received by the first node; regarding claim 12, wherein the first virtual channel is a non-posted command virtual channel and the second virtual channel is a probe virtual channel; regarding claim 17, wherein the first control packet comprises a probe packet generated in response to a second control packet received by the second node; regarding claim 26, wherein the first virtual channel is a non-posted command virtual channel and the second virtual channel is a probe virtual channel; regarding claim 31, wherein the first control packet comprises a probe packet generated in response to a second control packet received by the node. See column 3, lines 5-21; column 41-42. It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Leung et al. and Scott, by using the features, as taught by VanDoren et al., in order to provide an efficient data communication system by avoiding deadlock. See VanDoren et al., column 3, lines 5-21.

7. Claims 21, 40, 41, 45, 46, 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leung et al. (US 4,905,231) in view of VanDoren et al. (US 6,279,084).

Leung et al. discloses the claimed limitations above. Leung et al. does not disclose the following features: regarding claim 21, wherein the plurality of virtual channels includes a non-posted command virtual channel and a probe virtual channel; regarding claim 40, wherein packets that are defined to cause a response packet comprise non-posted command packets; regarding claim 41, wherein non-posted command packets comprise read command packets and write command packets; regarding claim 45, wherein packets that are defined to cause a response packet comprise non-posted command packets; regarding claim 46, wherein non-posted command packets comprise read command packets and write command packets; regarding claim

47, wherein packets that are defined to cause a response packet comprise probe packets. VanDoren et al. discloses a switch-based multi-processor system comprising the following features: regarding claim 21, wherein the plurality of virtual channels includes a non-posted command virtual channel and a probe virtual channel; regarding claim 40, wherein packets that are defined to cause a response packet comprise non-posted command packets; regarding claim 41, wherein non-posted command packets comprise read command packets and write command packets; regarding claim 45, wherein packets that are defined to cause a response packet comprise non-posted command packets; regarding claim 46, wherein non-posted command packets comprise read command packets and write command packets; regarding claim 47, wherein packets that are defined to cause a response packet comprise probe packets. See column 3, lines 5-21; column 41-42. It would have been obvious to one of the ordinary skill in the art at the time of the invention to modify the system of Leung et al., by using the features, as taught by VanDoren et al., in order to provide an efficient data communication system by avoiding deadlock. See VanDoren et al., column 3, lines 5-21.

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kwang B. Yao whose telephone number is 703-308-7583. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi H Pham can be reached on 703-305-4378. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KWANG BIN YAO
PRIMARY EXAMINER

Kwang B. Yao
June 14, 2004